Discussion Paper 1: Quantifying the Efficiency of Agricultural Water Use (Project A1)

[*Note: This paper represents DWR staff's preliminary understanding of provisions in the Water Conservation Act of 2009, referred to below as SBx7-7, and is not considered to be DWR's official position. DWR invites comment and input on the preliminary understanding and identified key issues presented in this paper. Comments should be submitted to DWR staff at agwue@water.ca.gov*]

SBx7-7, enacted in November of 2009, includes provisions on water conservation, measurement, and reporting activities for agricultural water suppliers. DWR is coordinating with the Agricultural Water Management Council, academic experts and other stakeholders to develop a methodology for quantifying the efficiency of agricultural water use.

Provisions of SBx7-7 Related to Quantifying Agricultural Water Use Efficiency

Paragraph 10608.64 of SBx7-7 states:

> *The department, in consultation with the Agricultural Water Management Council, academic experts, and other stakeholders, shall develop a methodology for quantifying the efficiency of agricultural water use. Alternatives to be assessed shall include, but not be limited to, determination of efficiency levels based on crop type or irrigation system distribution uniformity. On or before December 31, 2011, the department shall report to the Legislature on a proposed methodology and a plan for implementation. The plan shall include the estimated implementation costs and the types of data needed to support the methodology. Nothing in this section authorizes the department to implement a methodology established pursuant to this section.*

DWR Staff's Preliminary Understanding

The methodology developed and reported to the Legislature by December 31, 2011 will address efficiency at different spatial scales of agricultural water use. Appropriate scales should include: (1) on-farm, (2) agricultural water supplier, and (3) regional. These scales are not simply different levels of aggregation for reporting. That is, a supplier-level quantification of water use efficiency is not simply a weighted average of on-farm efficiencies – rather, it would take into account the flow of water to, from, and between fields and farms (i.e., return flow, reuse, and conveyance loss).

There is no authorized implementation of a methodology included in the legislation. However, methods developed at each spatial scale, if implemented, can improve the understanding of the efficiency of agricultural water use – an understanding that can guide projects, programs, and policies at local, regional, and state levels. Methodologies for quantifying the efficiency of agricultural water use also provide a foundation to support other goals, including: recognizing

the value of historic investments in water management, understanding the benefits and limitations of current management practices, and evaluating the benefits of change to current management practices.

A critical element of developing the methodology at each scale is identifying the data needed to quantify efficiency. For example, the legislation states that the methodology must include consideration of crop type and irrigation system distribution uniformity. For determining on-farm efficiency of agricultural water use, seasonal irrigation application rates and evapotranspiration would be required. For determining efficiency at the scale of a water supplier or a region, data would include stream or canal diversion quantities and return flow measurements.

The legislation also requires the report to include an implementation plan for the methodology and an estimate of the cost to implement. DWR staff does not intend that the report will assign implementation responsibility and cost to specific entities (such as DWR or the water supplier). The report may, however, recognize that different data gathering and calculation activities can be implemented effectively and efficiently by different entities. For instance, for quantification at the on-farm scale, the local water supplier may be the most cost-effective entity to collect data. In contrast, a regional-scale quantification methodology could involve a combination of entities, including DWR, water suppliers, and the U.S. Bureau of Reclamation.

Key Issues Identified

DWR staff has identified a number of issues and questions that need further clarification or discussion. The list below is not exhaustive, and DWR hopes to identify additional questions and possible solutions through public listening sessions and meetings with the Agricultural Stakeholder Committee.

- DWR staff understands that efficiency of agricultural water use can be defined in different ways and for different spatial scales. An important role of the ASC will be to advise DWR on the appropriate definitions. What should DWR consider as possible components of a definition of water use efficiency for a particular spatial scale?
- Should efficiency be measured seasonally, annually, or over multiple years? Should the time frame vary with the spatial scales discussed previously (e.g. regional scale on an annual or multiple year basis and on-farm on a crop-season basis)?
- Should the methodology allow for reporting of results by, for example, crop type, irrigation system type, geographic region, or water source?
- Should the implementation plan recommend the entities that should be the primary collectors of data?
- To what extent can or should existing methodologies and data be relied upon for the methodology at each spatial scale? For instance, could an on-farm scale methodology use the methodology developed and used by the Mobile Irrigation Lab services previously funded by DWR and U.S. Bureau of Reclamation (and often operated by Resource Conservation Districts)?

- Should regional scales be aligned with Integrated Regional Water Management Planning regions to allow for further integration of data and to facilitate IRWMP planning and implementation activities? Or, should other regional boundaries be considered?
- Quality control of data collected for each spatial scale methodology will be an important part of the methodology. Who should be charged with quality control planning, training and implementation? For instance, DWR historically funded systematic quality control by an independent entity. Should the level and method of quality control vary for each spatial scale methodology developed?
- The legislation requires DWR to include "estimated implementation costs" in the plan submitted to the legislature. In this context, what cost components are necessary to estimate cost of implementation (e.g. data collection, compilation and assessment; quality control)? Specifically, are there local implementation costs that might be imposed on water suppliers or growers that DWR should be sure to consider?